

WHAT IS CLAIMED IS:

1. A wavelength selective optical device comprising:
  - a first graded index rod lens having a first end surface thereof on which a divergent light is incident, and a second end surface thereof from which a parallel light beam is emitted;
  - and
  - an optical filter arranged to face to the second end surface of the first graded index rod lens so that the parallel light beam emitted from the first graded index rod lens is incident on the optical filter;
  - wherein a refractive index distribution constant of the first graded index rod lens is adjusted such that a wavelength range of the light which is reflected or transmitted by the optical filter is tuned within a desired range.
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2. A wavelength selective optical device according to claim 1, wherein the optical filter is a multi-layered optical interference filter, and
  - the refractive index distribution constant of the first graded index rod lens is adjusted such that a representative wavelength of the light reflected or transmitted by the optical filter is tuned within a desired range.
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3. A wavelength selective optical device according to claim 1, wherein the optical filter is formed directly on the second
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end surface of the first graded index rod lens as a film.

4. A wavelength selective optical device, according to  
claim 1, further comprising a cylindrical member wherein the  
5 first graded index rod lens is inserted from one end portion  
of the cylindrical member so that the first graded index rod  
lens is fitted without clearance to the cylindrical member,  
and the optical filter is provided on another end portion of  
the cylindrical member.

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5. A wavelength selective optical device according to claim  
1, wherein the first graded index rod lens is selected among  
a plurality of graded index rod lens groups having various  
different refractive index distribution constants.

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6. A wavelength selective optical device comprising:  
a first optical fiber in which optical signals with a  
plurality of multiplexed wavelengths is propagated;  
a first graded index rod lens having a first end surface  
20 thereof on which a light emitted from an end surface of the  
first optical fiber is incident, and a second end surface thereof  
from which a parallel light beam is emitted;  
an optical filter arranged to face to the second end  
surface of the first graded index rod lens so that the parallel  
25 light beam emitted from the first graded index rod lens is

incident on the optical filter; and  
a second optical fiber arranged on a side of the first  
end surface of the first graded index rod lens to which a light  
reflected by the optical filter is coupled through the first  
5 graded index rod lens;

wherein a refractive index distribution constant of the  
first graded index rod lens is adjusted such that a wavelength  
range of the light reflected by the optical filter is tuned  
within a desired range.

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7. A wavelength selective optical device according to claim  
6, further comprising a second graded index rod lens having  
a first end surface thereof facing to the optical filter, and  
a third optical fiber arranged on a side of a second  
15 end surface of the second graded index rod lens to which a light  
transmitted from the optical filter is coupled through the second  
graded index rod lens.

8. A wavelength selective optical device according to claim  
20 6, wherein the optical filter is a multi-layered optical  
interference filter, and

the refractive index distribution constant of the first  
graded index rod lens is adjusted such that a representative  
wavelength of the light reflected by the optical filter is tuned  
25 within a desired range.

9. A wavelength selective optical device according to claim 6, wherein the optical filter is formed directly on the second end surface of the first graded index rod lens as a film.

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10. A wavelength selective optical device, according to claim 6, further comprising a cylindrical member wherein the first graded index rod lens is inserted from one end portion of the cylindrical member so that the first graded index rod 10 lens is fitted without clearance to the cylindrical member, and the optical filter is provided on another end portion of the cylindrical member.

11. A wavelength selective optical device according to claim 6, wherein the first graded index rod lens is selected among a plurality of graded index rod lens groups having various different refractive index distribution constants.

12. A wavelength selective optical device comprising:  
20 a first optical fiber in which optical signals with a plurality of multiplexed wavelengths is propagated;  
a first graded index rod lens having a first end surface thereof on which a light emitted from an end surface of the first optical fiber is incident, and a second end surface thereof  
25 from which a parallel light beam is emitted;

an optical filter arranged to face to the second end surface of the first graded index rod lens so that the parallel light beam emitted from the first graded index rod lens is incident on the optical filter;

5       a second graded index rod lens having a first end surface thereof facing to the optical fiber; and

          a second optical fiber arranged on a side of a second end surface of the second graded index rod lens to which a light transmitted from the optical filter is coupled through the second  
10      graded index rod lens,

          wherein a refractive index distribution constant of the first graded index rod lens is adjusted such that a wavelength range of the light transmitted from the optical filter is tuned within a desired range.

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13.      A wavelength selective optical device according to claim 12, wherein the optical filter is a multi-layered optical interference filter, and

          the refractive index distribution constant of the first  
20      graded index rod lens is adjusted such that a representative wavelength of the light transmitted from the optical filter is positioned within a desired range.

14.      A wavelength selective optical device according to claim  
25      12, wherein the optical filter is formed directly on the second

end surface of the first graded index rod lens as a film.

15. A wavelength selective optical device according to claim  
12, wherein the first graded index rod lens is selected among  
5 a plurality of graded index rod lens groups having various  
different refractive index distribution constants.

16. A method of tuning a wavelength characteristic of a  
wavelength selective optical device in which a divergent light  
10 is collimated and incident on an optical filter through a graded  
index rod lens, a predetermined wavelength range of the light  
incident thereon is reflected or transmitted by the optical  
filter, the method comprising the steps of:

changing the graded index rod lens for another graded  
15 index rod lens having a different refractive index distribution  
constant such that the wavelength range of the light reflected  
or transmitted by the optical filter is tuned within a desired  
range.

20 17. A method of tuning a wavelength characteristic of a  
wavelength selective optical device according to claim 16,  
wherein the optical filter is a multi-layered optical  
interference filter, and

25 the refractive index distribution constant of the first  
graded index rod lens is adjusted such that a representative

wavelength of the light reflected or transmitted by the optical filter is tuned within a desired range.

18. A method of tuning a wavelength characteristic of a  
5 wavelength selective optical device according to claim 16,  
wherein the optical filter is formed directly on the graded index rod lens as a film.

19. A method of tuning a wavelength characteristic of a  
10 wavelength selective optical device according to claim 16,  
wherein the graded index rod lens is inserted from one end portion of a cylindrical member so that the graded index rod lens is fitted without clearance to the cylindrical member, and the optical filter is provided on another end portion of the  
15 cylindrical member.

20. A method of tuning a wavelength characteristic of a wavelength selective optical device according to claim 16,  
wherein the graded index rod lens is selected among a plurality  
20 of graded index rod lens groups having various different refractive index distribution constants.